



Problem of the Week

Problem C and Solution

They Take the Cake

Problem

Jessica, Callista, Peter, and Monica went to the bakery to buy seven cakes. Each cake costs \$9.00. Jessica paid \$27.00, Callista paid \$9.00, and Peter paid \$22.50. Monica paid the remaining amount. They divide the cakes so that the fraction of the total that each person paid is equal to the fraction of the total amount of cake that each person receives.

What amount of cake should each person receive?

Solution

Solution 1

If Jessica, Callista, Peter and Monica buy a total of seven cakes at \$9.00 per cake, then they paid a total of $7 \times \$9.00 = \63.00 .

Jessica paid \$27.00, Callista paid \$9.00, Peter paid \$22.50 and Monica paid the remainder. Therefore, Monica paid $\$63.00 - \$27.00 - \$9.00 - \$22.50 = \$4.50$.

Since $3 \times \$9 = \27.00 then Jessica should receive 3 cakes.

Since $1 \times \$9 = \9.00 then Callista should receive 1 cake.

Since $0.5 \times \$9 = \4.50 then Monica should receive 0.5 cakes.

Thus, Peter should get $7 - 3 - 1 - 0.5 = 2.5$ cakes.

Solution 2

If Jessica, Callista, Peter and Monica buy a total of seven cakes at \$9.00 per cake, then they paid a total of $7 \times \$9.00 = \63.00 .

Jessica paid \$27.00, Callista paid \$9.00, Peter paid \$22.50 and Monica paid the remainder. Therefore, Monica paid $\$63.00 - \$27.00 - \$9.00 - \$22.50 = \$4.50$.

Jessica should receive $\frac{27}{63} = \frac{3}{7}$ of the total amount of cake. So Jessica should receive $\frac{3}{7}$ of 7, or $\frac{3}{7} \times 7 = 3$ cakes.

Callista should receive $\frac{9}{63} = \frac{1}{7}$ of the total amount of cake. So Callista should receive $\frac{1}{7}$ of 7, or $\frac{1}{7} \times 7 = 1$ cake.

Peter should receive $\frac{22.5}{63} = \frac{225}{630} = \frac{25}{70} = \frac{5}{14}$ of the total amount of cake. So Peter should receive $\frac{5}{14}$ of 7, or $\frac{5}{14} \times 7 = \frac{5}{2} = 2\frac{1}{2}$ cakes.

Monica should receive $\frac{4.50}{63} = \frac{45}{630} = \frac{5}{70} = \frac{1}{14}$ of the total amount of cake. So Monica should receive $\frac{1}{14}$ of 7, or $\frac{1}{14} \times 7 = \frac{1}{2}$ of a cake.

We can check that all of the cake has been distributed. If there were any errors in our solution, this may help us catch them. Jessica receives 3 cakes, Callista receives 1 cake, Peter receives $2\frac{1}{2}$ cakes and Monica receives $\frac{1}{2}$ of a cake. The total number of cakes distributed is $3 + 1 + 2\frac{1}{2} + \frac{1}{2} = 7$, as required.